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Family Affairs

With so much talk being directed towards the disadvantages of the State ownership of industry, we believe that nothing could be more illuminating to those supporters of nationalisation than the study of the history of the hundreds of family businesses included in the foundry industry. Here are a few case histories, using, of course, fictitious names. Jones was a moulder, who had a grievance against his union, and at the earliest possible moment, though with a minimum of capital, started on his own account. Business prospered and slumped, and during the latter period the firm was reduced to the combined efforts of the owner and his wife, aided in the late afternoon by a lorry driver, who helped with the casting up. To-day, Jones, now middle-aged, has a well-conducted mixed foundry employing over 50 men. His son, a university graduate, is now a partner.

Brown, on the other hand, was nearly ready for retiring from his position as foundry foreman at the conclusion of the 1914 war, but there was to be considered the future of his boys returning from active service. So with £77 capital and a lifetime's experience, a new foundry was born. It passed through good times and bad, but to-day it is quite a sizeable establishment, steadily progressing by the periodic addition of new machinery and the creation of modern offices—every step based on a realisation of current industrial trends, but avoidance of anything in the nature of a gamble.

Finally there is the graduate of one of the older universities. His business, carried out in the heart of the country, is of quite recent origin. In his badly-housed shop he has installed a Sandslinger, fed by a sand-conditioning machine, to ram up boxes, the patterns of which are stripped on a machine and handled on roller conveyors. His enterprise merits the success which so far has attended his efforts.

These men have done, and are doing, a real service to the community; their only sin in the eyes of the theoretical advocates of State monopolies is that they are liable to make money. They are, however, equally liable to lose their everything in times of slump. They take that risk. They are all individualists, and above all they are realists. The second generation may not have to work as hard as their fathers, but no guarantee is afforded them of security from crêche to crematorium. The high standards set by their fathers must be maintained. Not one of them, from personal observation, would show up to advantage if working for a State monopoly, and conversely a brilliant civil servant has a mental make-up quite unsuited for the successful sole conduct of a small manufacturing company. Both types are essential for the proper conduct of any well-balanced manufacturing country and both require and merit the opportunity of doing good work in their own spheres. The merging of these spheres through State ownership will engender dangerous national economic chaos. Jones, Brown and Smith, each in their own way, have taken serious risks to ensure, as far as lay in their power, their own independence and that of their children. They are obviously receptive of new ideas—a phase of business which becomes increasingly difficult with increasing size, because so much more is involved. Thus, when one reaches the State monopoly level, one finds progress lethargic, as witness the present state of the Post Office—one of the oldest cases of public ownership. It is a sad commentary that London, the greatest city in the world, has fewer telephones than either New York or Chicago, where private enterprise is extant—enterprise probably started by a man of much the same calibre as Jones, Brown and Smith.

Contents

Family Affairs, 593.—Monopolies and Restrictive Practices, 594.—London Branch Annual Dinner, 594.—Visual Aids, 596.—Publications Received, 598.—The Heat-Treatment of Foundry Bronzes, 599.—Royal Institute of Chemistry, 601.—New Catalogue, 601.—Metal on Wooden Pattern Boards, 602.—Book Reviews, 602.—Notes from the Branches, 603.—E.R.P. Funds Misuse Alleged by E.C.A., 605.—Equipment for Welsh Steelworks, 606.—News in Brief, 606.—Company News, 607.—Obituary, 608.—Wear Shipbuilding, 608.

Monopolies and Restrictive Practices

By F. J. Tebbutt

Under the Monopoly & Restrictive Practices (Inquiry & Control) Act 1948, the Board of Trade can, if the circumstances of any case come within the conditions laid down in the Act (which concerns monopolies and restrictive practices in trade), refer such a case to a new body called "The Monopolies & Restrictive Practices Commission" for investigation and a report.

The conditions which must exist before action can be taken—conditions in respect to the supply of goods in the U.K.—are that at least one-third of all the goods are being supplied by or to any one person or by or to any two or more persons (this applies to inter-connected companies as well) acting together. The foregoing applies in relation to processed goods and goods for export; the Act with certain necessary textual differences applying the "one-third" rule to these goods likewise. Investigations can be made where there may be no arrangement or agreement, but where competition may be restricted or prevented, this provision really being directed to what is known colloquially as "price leadership," where a concern may be able to influence prices and other conditions of supply, so that their price and conditions become the price and conditions generally.

Investigation Details

An investigation by the Commission may be just confined to the facts of a case, that is, to see whether the conditions as above prevail, but also in addition they may be called upon to see whether the matters before them operate, or are likely to operate against public interest. The Committee, if the question of public interest is involved, must lay its report on the case before Parliament, and in other cases it has discretion either to do so or not to do so. The Board of Trade, however, may decide that certain parts of any report shall not be publicised if it considers that publication would be against public interest, and it can omit anything which may relate to a secret process or mention the presence, absence, or situation of any mineral or other deposits, and can also omit any matter which would substantially damage the business interests of any person.

Sanctions to Apply

Where the Commission find that the conditions of any case are against public interest and are matters which the Act is designed to remedy or prevent, the Board of Trade (or the Ministries of Supply, of Food, of Agriculture & Fisheries, of Fuel, of Works, or the Home Office) can declare by Order the following matters illegal, and all or any of these can be adopted according to the case. Thus it can be declared unlawful to carry out any agreement mentioned in the Order, and to require that such an agreement be determined. The withholding of supplies can be made illegal (*e.g.*, boycotts, stop lists, and discrimination); as can the giving of preferences as regards the provision of, or the giving of orders for supplies or services (*e.g.*, rebates given for confining trade to a particular seller, special discounts given and the like); and also it can be declared illegal to require, as a condition for the supply of certain goods, the buying of other goods (*e.g.*, conditional sales and conditional supplies). The Orders, however, must be approved by both Houses of Parliament, before actually becoming law.

Criminal proceedings cannot follow the breach of any such Order, but civil proceedings can be instituted either by the Government or any person affected, for an injunction or other relief.

Special Point

A point of importance is that while the Commission will mostly consider specific matters referred to them, the Board of Trade can request that information be given them as regards matters covered by the Act as regards the supply of goods, processed goods or goods for export, and this provision would allow questions concerning public bodies (*e.g.*, nationalised industries, marketing boards, *etc.*) to be asked, although these bodies are not within the Act as regards investigations and such-like matters.

London Branch Annual Dinner

Last Friday, over 150 members and guests of the London Branch of the Institute of British Foundrymen assembled at the Café Royal, Regent Street, for the Annual Dinner and Dance. It must be seldom that so many distinguished personalities of the Institute forgather to grace a Branch function. Among the guests there were present the National President, Mr. R. B. Templeton, M.I.Mech.E.; the Senior Vice-President, Mr. N. P. Newman; the Junior Vice-President, Mr. J. J. Sheehan; and the Institute's Secretary and Assistant Secretary, Mr. T. Makemson, M.B.E., and Mr. G. Lambert. Also among the company were several members of the Council and officers from other branches.

After the loyal toast, Mr. R. B. Templeton proposed that of the "London Branch." In the course of his remarks he paid tribute to Mr. V. C. Faulkner, who, during the building-up of the Branch, had been first its Honorary Secretary, then its President, and, later, once again its Secretary. The membership of the Branch was stated to be 692—which would make it the largest branch of the British Institute and only a few short of being the largest branch of any foundry institute in the world. Mr. P. D. Pincott, the Branch President, replied suitably to the toast and, later, Mr. F. Arnold Wilson, Branch Honorary Secretary, proposed "The Guests." This was responded to on their behalf by Mr. N. P. Newman, Senior Vice-President of the Institute, who disclosed that although now he was considered a "guest," he had first joined the London branch and had since been transferred. The dancing, which terminated the evening's programme, was pleasingly interrupted by two short intervals for a cabaret show.

Visual Aids

By James Timbrell

Detailed description of a moulder's "chef d'œuvre"

To explain the various joint lines and "strip" for loose pattern moulding, is not easy for an instructor, nor is it simple for the trainee to follow. Split patterns indicate their own parting line, and for them oddsides are not necessary. It is not considered economical to make split patterns for oddments and other than standard lines, so, usually, oddsides or other means are used to place the pattern in position for line and strip. Sometimes, a wide flat joint is preferable to a "knife edge ricket."

Foundry Terms

Foundry nomenclature, which varies with the district, is sometimes bewildering. To advise "ramming a soldier up in a cod," may be readily understood in an area where a wood lifter is used to reinforce and carry a below-the-box-joint section of sand. A "feather runner" for "wick-iron," is really a spray of inlets placed to flow cleanly and evenly an intensely hot fluid iron. There is obviously scope for a united phraseology.

The present trend, owing to the diminishing number of experienced reliable moulders, is to provide (and wisely so) a term of practical schooling, to ensure that the learner is well grounded in the rudiments of the craft—still one of the most absorbing in the industrial arts. Science and mechanical aids have improved conditions and taken out much of the brawn-requiring labouring routine, the best moulders do not necessarily make the best teachers, and clarity in expression is often missing. It is in this direction that visual aids and practical work can be of real value in developing moulding ability.

FIG. 1.—CUP-AND-SAUCER-AND-SPOON CASTING MADE IN ONE PIECE, COMPLETE WITH RUNNERS AND "WHISTLERS."

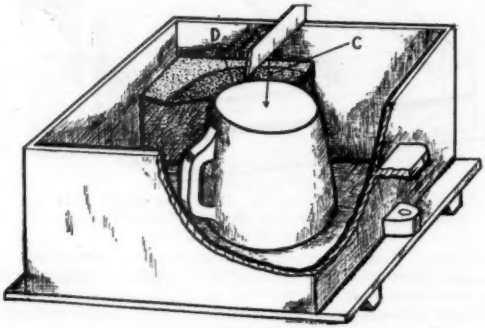


FIG. 2.—COMMENCEMENT OF MOULDING THE CUP.

"Training" Patterns

It is good practice to have available a few "training" patterns, which in use will demonstrate many tricks of the trade, such as simple tied "gaggering"; vent lead sealing; suitable running methods; joint lines and so on. Each method must be of a distinct character and be described in understandable terms, so that they can be applied to any appropriate production job later encountered. It is neither easy nor wise, to incorporate too many difficulties in one

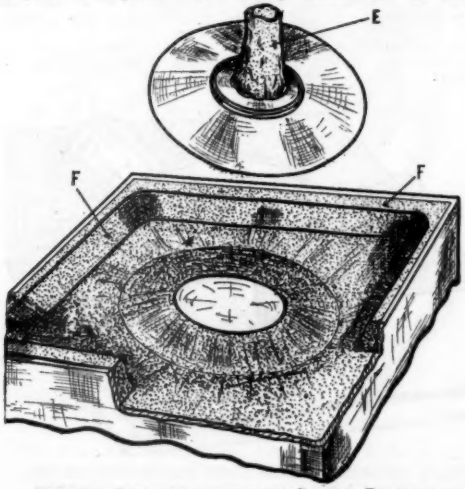


FIG. 3.—BEDDING-DOWN THE SAUCER PATTERN.

Visual Aids

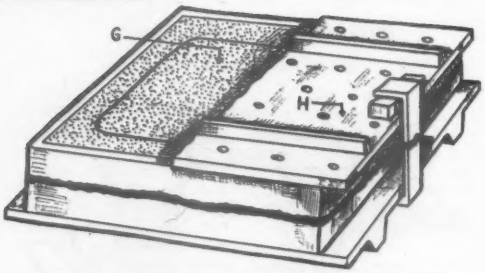


FIG. 4.—COMPLETION OF THE SLIP-JOINT AND CLAMPING OF THE BOTTOM BOARD.

"training" pattern, although sometimes an "almost-impossible-to-mould" pattern can be a useful "steadier" on rare occasions.

Many decades ago, the apprentice who could make an ordinary cup, saucer and spoon, in a two-parted moulding box, was considered something of an artist. The result had to be shown in one piece, complete with bottom rim runners and needle wire whistlers, as shown in Fig. 1. Friendly rivalry produced all manner of competitive tricks. One of the puzzles was a five-link chain, poured as one entity, with a top bar runner and direct inlets, which when broken away left the five free links.

Even if these be designated freak moulding, yet they constitute one of the reasons why castings made by "old timers" can be readily identified in the fettling shops of to-day. A fitting termination to a term of apprenticeship* could perhaps be a border line article, which to produce, would show practical evidence of the success or otherwise of the training. As a suggestion, this could be in the form of shell statuette designed in such a way as to include some of the technique acquired.

*In the Mediæval Guilds, the apprentice was required to produce a *chef d'œuvre* before he became a master moulder.—EDITOR.

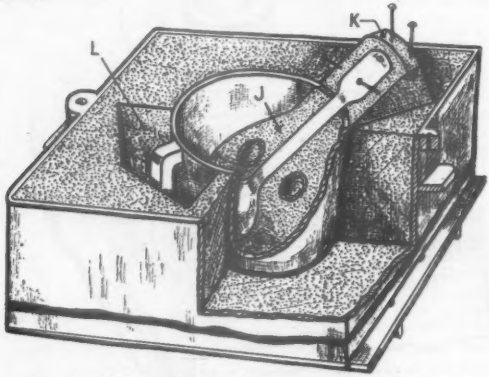


FIG. 5.—MOULD TURNED OVER FOR BEDDING-IN THE SPOON AND CUTTING-AWAY FOR THE CUP HANDLE.

Cup, Saucer, and Spoon Moulding

The cup and saucer article may stimulate ideas in this connection; it is not suggested that moulding cups

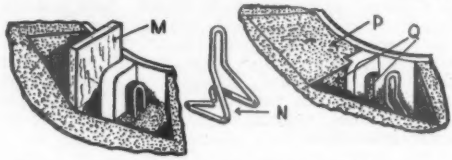


FIG. 6.—MAKING THE CUP-HANDLE DRAWBACKS.

and saucers is an economical or commercial proposition, but, like freehand drawing, it will develop a steady hand and an eye for a line, both useful in moulding. The descriptive text is brief, but the sketches are largely self-explanatory. For a pattern, a thick-sectioned well-tapered cup and saucer is preferable to the bone china. A barrel-shaped cup should be avoided, although this could be moulded. The cup is placed on a ramming-up board and the bottom half of a two-part (fixed-pin-type) moulding box is put in position as shown in Fig. 2, ensuring that there is enough space, C, to permit a slip joint. Ramming up is done in a finely sieved, strong-green-bond sand, up to a level shown in part-section D, leaving the sand face a shade high, to allow for bedding down the saucer, Fig. 3. This involves good exercise in the

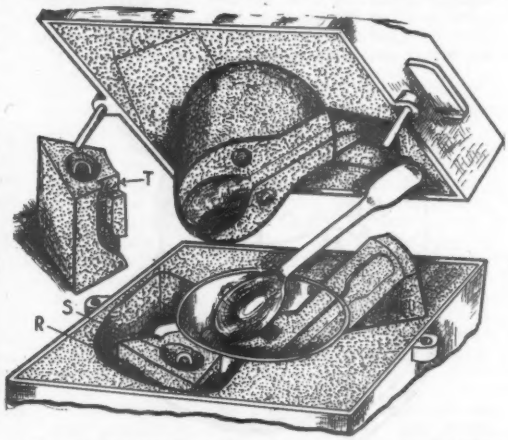


FIG. 7.—REMOVAL OF THE TOP HALF OF THE MOULD; WITHDRAWAL OF THE SPOON AND THE TWO CUP-HANDLE DRAWBACKS.

use of a small mallet associated with a fragile pattern. A piece of damp clay, E, will enable the saucer pattern to be lifted on and off for each bed inspection, until the mould face is evenly bedded to the correct hardness.

Arranging the Slip-joints and Draw-backs

The slip-joint sides, F (Fig. 3), are then formed to the box joint level, as shown in the condensed sketch, Fig. 4, at G. A level core plate, H, is bedded on, and the rammed-up box and bottom board are clamped together for rolling over, to stand as shown in Fig. 5.

The spoon pattern is bedded on to a rammed-up section inside the cup shown at J. Two trowel-handle dimple impressions are made on this slip-joint face. The stepped-up joint, K, is formed with a generous taper and secured in place with moulders' pins. A space is cut away round the cup handle L—this also carries a good taper. When completed the sides and angle faces are spread evenly with damp parting sand, to ensure a non-sticking "strip" later on.

Two wire drawback carriers, N, Fig. 6, are made and bedded (in turn) on to a thin layer of sand and are placed in the bottom of the drawback space. A piece of wood, or dried core, M, is used initially to divide the draw-backs and to withstand the ramming, which is carried out to a level shown at P. Jointing the handle is effected as indicated at Q, and this face is covered with wet parting sand, and the second half drawback is rammed up in a like manner. The top-half moulding-box is put on and rammed up, using five-inch sprigs or other lifters, to carry the cup "cod," taking care not to strike these down into the slip-joint section

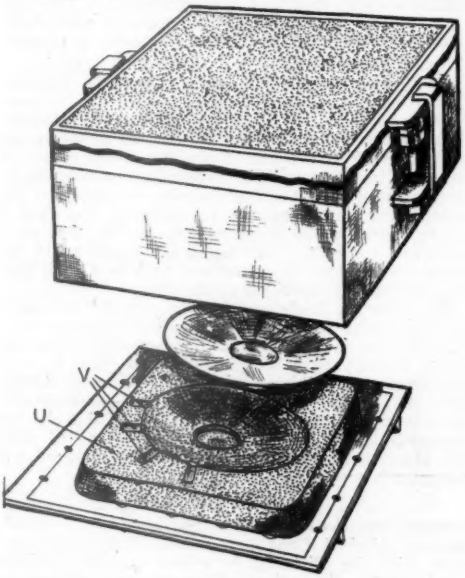


FIG. 8.—MOULD BOX-PARTS CLAMPED, TURNED OVER, AND BOTTOM SLIP-JOINTED SECTION REMOVED.

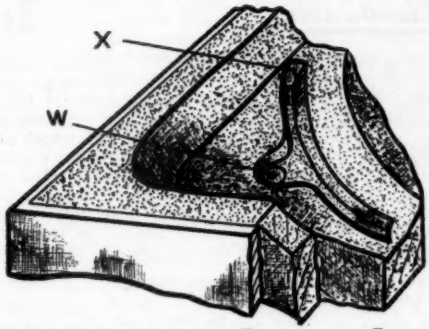


FIG. 9.—LOCATION OF THE DEEP-SECTION RUNNER BAR AND DOWNGATE.

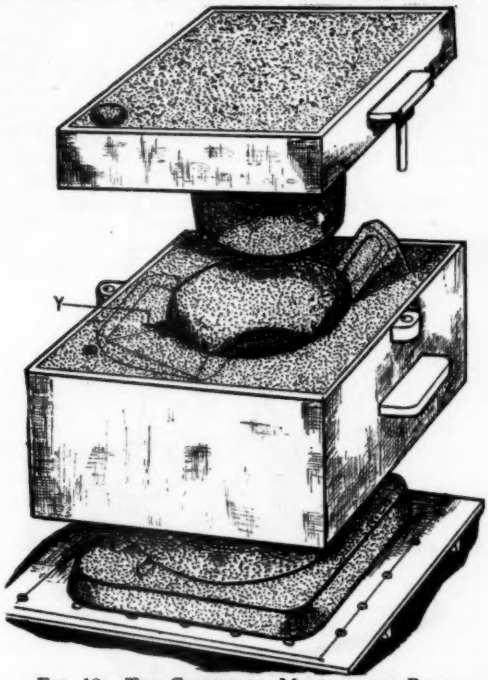


FIG. 10.—THE COMPLETED MOULD-PARTS READY FOR ASSEMBLY; CUP-HANDLE DRAWBACKS IN POSITION.

Visual Aids

during the ramming. The top-half mould is then lifted off, as shown in Fig. 7, is rolled over and put on one side. The spoon is drawn off the slip-joint face, left behind in the cup, and a space, R, is cut away round the two drawbacks, and also round the drawback carrier staples, S. Pliers can be used to remove the drawbacks and put them aside; one is shown at T. The top is then closed and the two parts are clamped together, lifted and rolled over, bottom face uppermost, as shown in Fig. 8. This leaves behind the bottom slip-joint, U. Inlet runners are cut into the saucer rim, V.

Closing the Mould

A sharp-cutting, down-tube runner is pushed through the assembled half moulds, in the appropriate corner opposite, W, Fig. 9, preferably to locate opposite the spoon bottom inlet. When the complete mould is finally closed, a deep section runner bar, X, is also cut to register with the saucer inlets, which have been already cut in the bottom slip-joint face After removing the box clamps the half-mould is rolled back and put into place on the slip-joint. The drawbacks are then put in position and the cut-away space is rammed in, as shown at Y, Fig. 10. This move leaves the cup on the top half-mould, which, when lifted, leaves the cup slip-joint behind, as shown in Fig. 11; the two trowel-handle dimples keep this in place. Mou'ders' pins (or thin pieces of wire) will secure this *in situ*; making sure that the pins or wires are not pushed through the inner spoon impression, which cannot be seen. Needle wire vents are pushed clear through the rim and spoon top. When all is secure, the top is rolled over (and this is the crucial moment) and the mould is finally closed and weighted. A cone-shaped runner basin is advisable, because the job has to be poured in a "split second."

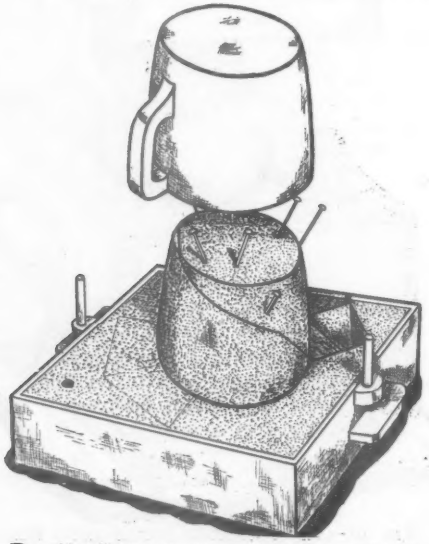


FIG. 11.—REMOVAL OF THE CUP PATTERN AND SECURING OF THE SPOON SLIP-JOINT PORTION.

Publications Received

Centrifugal Casting in Germany with Particular Reference to the Production of Non-ferrous Tubes, being B.I.O.S. Report No. 1797 (Item No. 21). Published through H.M. Stationery Office by the Technical Information and Document Unit, 40, Cadogan Square, London, S.W.1. Price 6s. net.

This publication contains reports covering the visits to eight works. Though the title indicates that the contents are mainly concerned with non-ferrous metals, this is not strictly true. There are sections dealing with the production of steel gun-tubes and cast-iron pipes. Then there are the "bi-metal" castings, whereby two or more types of steel are incorporated in the component. There is an interesting description of the casting of copper-tin alloys, wherein the die is lined with copper sheet. The casting of phosphor-bronze plates is well described and illustrated. This report is certainly one of the most interesting published by the B.I.O.S. dealing with foundry practice in Germany.

High-strength Nickel Alloy Cast Iron. Issued by the Mond Nickel Company, Limited, Grosvenor House, Park Lane, London, W.1.

A service of real worth to ironfoundry executives has been completed by the publication of the booklet. The opening pages tell of the development of high-strength irons since 1930. The assertion that there is a correlation between high tensile strength and other mechanical properties can be accepted, but that the range starts at 20 tons per sq. in. is new to the reviewer. Mentally he started the range at 18 tons. However, 20 tons is convenient as it is at this figure that the recently-specified grades start.

Hereafter the fundamental usefulness of the pamphlet reveals itself, for good information is given as to composition, though, in a few cases, a little elaboration might usefully have been incorporated. Yet it can be presumed that bulkiness might easily, through dilution, mar the appeal of the booklet. The illustrations have been well chosen and in every way this eighteen-page publication maintains the high standard which the Mond Nickel Company enjoy in the field of trade literature.

Foundry Practice, No. 92, published by Foundry Services, Limited, Long Acre, Nechells, Birmingham, 7, deals with the blistering in a heat-treated aluminium alloy gravity die-casting. The alloy was shown not to be "up to specification." There is also a second article on this subject concerned with the design of moulds.

The Heat-Treatment of Foundry Bronzes

By W. T. Pell-Walpole, D.Sc.

(*Continued from page* 580.)

Heat-treatment of Brittle Tin-rich Bronzes

The high-phosphorus 14 per cent. tin bronzes in the cast condition were as brittle as the high-tin bronzes discussed earlier, but their tensile strength was rather higher. After heat-treatments of 2 hours at 600 deg. C. their interlocking structures were broken down, but appreciable amounts both of δ and of Cu_3P phases remained undissolved (Figs. 10 and 11). The 14 per cent. tin, 0.5 per cent. phosphorus bronze, cooled slowly after annealing, developed properties almost identical with those of the 17 per cent. tin bronze in the quenched condition, *i.e.*, high strength but accompanied by moderately high elongation. The 14 per cent. tin, 1 per cent. phosphorus alloy, however, gave the same tensile strength with a lower elongation, 10 per cent., though this is probably sufficient for the requirement of a bearing alloy. This composition, therefore, would seem to give the optimum combination of high hardness, high yield strength and moderate elongation.

It is of interest to note that all the alloys listed in Table III have similar values of tensile strength, all over 30 tons per sq. in., after the preferred heat-treatments. Elongation values vary from 5 to 30, so that a reasonable range of properties is available, according to the type of service required. It is suggested that some of these compositions might be suitable for trial applications as high-duty gear bronzes.

Effect of Initial Condition of the Casting on its Response to Heat-treatment

Improvements in mechanical properties of the order shown in the preceding investigations can only be obtained in sound chill castings. The presence of porosity severely restricts the improvement obtainable by annealing, particularly improvement in elongation. Similarly, variations in the rate of cooling of the original casting, with consequent variations in the amount of the brittle phases present in the as-cast condition, will also modify the degree of improvement obtained on subsequent annealing.

Some typical results showing the effect of casting conditions (rate and temperature of pouring used for ingots of Admiralty gun metal) on the improvements obtained by heat-treatment are shown in Figs. 12 and 13. The extent of improvement decreases as either the rate or temperature of pouring is increased, *i.e.*, as porosity increases or as the initial amount of $(\alpha+\delta)$ decreases.

Lee and Northcott[10] have shown similarly that the extent of improvement obtained by annealing wheel-type castings in phosphorus bronzes and in gun metals varies with the amount of eutectoid present and with the soundness of the casting. Wheels poured at low temperatures were improved more on annealing than those poured at high temperatures, while the better-fed centrifugal castings gave a better response to annealing that the less sound static sand-castings poured at the same temperatures. In the centrifugal castings the degree of improvement increased with the speed of rotation (Table I).

Effects of Heat-treatment on other Properties

(a) *Pressure Tightness*

It is well established that heat treatment of bronzes causes a slight fall in density due to an increase in

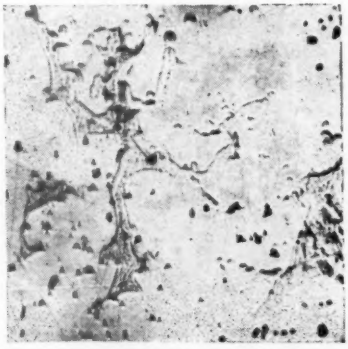


FIG. 10.—BRONZE CONTAINING 14 PER CENT. TIN AND 0.5 PER CENT. PHOSPHORUS. ANNEALED FOR 2 HOURS AT 600 DEG. C. Isolated areas of $\alpha + \delta + Cu_3P$ in α matrix. × 350. Properties: U.T.S., 31.0 tons per sq. in. Elongation, 30 per cent. B.H.N. 130.

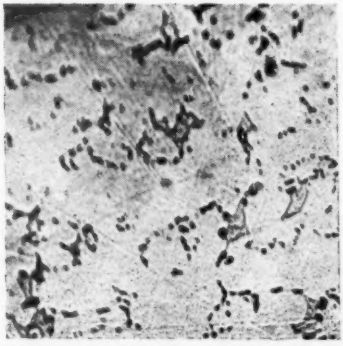


FIG. 11.—BRONZE CONTAINING 14 PER CENT. TIN AND 1.0 PER CENT. PHOSPHORUS. CHILL CAST AND ANNEALED FOR 2 HOURS AT 600 DEG. C. Isolated areas of $(\alpha + Cu_3P)$ and $(\alpha + \delta + Cu_3P)$ in α matrix. × 350. Properties: U.T.S., 31.0 tons per sq. in. Elongation, 10 per cent. B.H.N., 135.

The Heat-Treatment of Foundry Bronzes

intercrystalline porosity.[10 11] This might be expected to cause a decrease of pressure tightness in bronze castings. However, as long ago as 1913, the Primrose brothers[3] stated that annealing gun metal castings gave improved pressure tightness, and many more recent observations support this statement. Thus Brislee[12] (1918) found that annealing for 30 minutes at 700 deg. C. rendered leaking gun-metal castings pressure tight. Similarly, Horner and Mason[13] (1944) recorded that valve bodies rejected because of leakage under high pressure were made serviceable by annealing for 2 hours at 650 deg. C. Riddell[14] (1945) made a careful investigation of this effect with gun-metal bushes, valve bronze and hydraulic bronze. Annealing in hydrogen gave no improvement, but annealing in air or in oxygen rich mixtures gave marked improvement in pressure tightness. This established that the sealing action of annealing was due to oxidation on the surfaces of the fissures, with the formation of oxide films having a greater specific volume than the metal. The oxidation process must penetrate for a considerable depth below the surface of the casting, since machining away the surface layer did not destroy the pressure-tightness of oxidation-sealed castings. Short-time pressure tests, such as those which must be employed in investigations of this type, must, as was pointed out by Riddell himself, be interpreted with caution, since they may not constitute a safe guide to performance under service conditions, where erosion, abrasion, stress effects, and

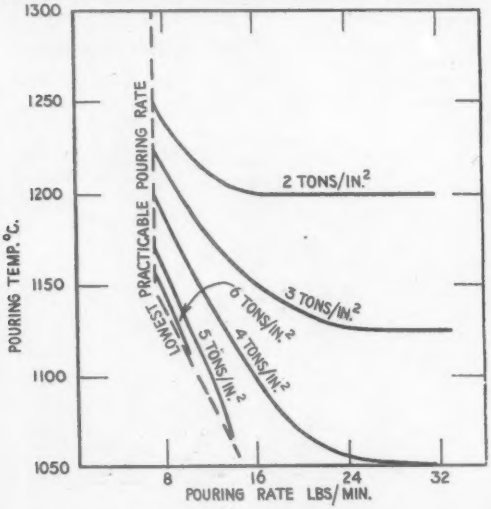


FIG. 12.—EFFECT OF POURING CONDITIONS ON THE IMPROVEMENT IN U.T.S. PRODUCED BY ANNEALING CHILL-CAST ADMIRALTY GUNMETAL. (1 IN. DIA.)

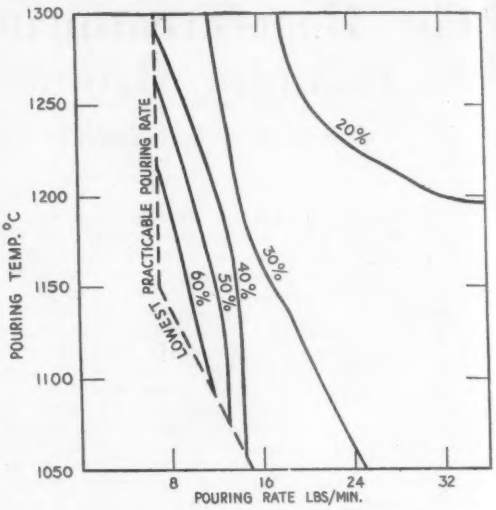


FIG. 13.—EFFECT OF POURING CONDITIONS ON THE IMPROVEMENT IN ELONGATION PRODUCED BY ANNEALING ADMIRALTY GUNMETAL. (1 IN. DIA.)

temperature changes come into play. In the Author's opinion, annealing should not be considered as the correct method of obtaining pressure tightness in castings, but should only be regarded as a last resort, in common with other sealing methods, after due attention has been paid to correct design composition and to melting and casting practice.

(b) *The Relief of Internal Stress by Annealing*

It was established by the early work of Primrose,[3] Comstock,[7] Smart[8] and Anderson,[5] referred to previously, that considerable stresses can be set up in bronze castings of very simple shape by rapid cooling from a high temperature. When shaped castings of widely differing section thickness cool from the casting temperature, such stresses may reach sufficient magnitude to cause cracking either during cooling, in subsequent machining or in service.

Rolfe[15] suggested that the occurrence of stress cracks during the machining of phosphor bronze castings could be avoided without interfering with their other desirable properties by casting in chills instead of in sand and subsequent annealing for 1 hour at 650 deg. C. Anderson and Eldridge[16] showed experimentally that artificially-induced stresses in ring castings of 87/7/5/1 gun metal could be relieved completely by annealing for a short time at 550 deg. C., while Benson and Allison[17] have shown that complete stress relief in Admiralty gun metal castings is obtained by annealing for 3 hours at 500 deg. C.

(*Concluded on page* 602.)

Royal Institute of Chemistry

London and South Eastern Counties Section

At a joint meeting of the Cambridge University Chemical Society, the Cambridge University Metallurgical Society, and London and South Eastern Section of the Royal Institute of Chemistry, recently held in the University Chemical Laboratory, Professor Austin presided. Sir Charles Goodeve gave a lecture on "Physical Chemistry in Steel Making." The lecture is summarised below:

Recent advances in metal physics, largely due to the experimental evidence from X-ray diffraction and to quantum-mechanical methods of dealing with valency, have provided a much more intimate picture of the nature of metals and metallic solutions, both solid and liquid, and of the complex but important substances known as slags. In metal solutions, we are now able to distinguish between those elements which take up positions in the interstices of the crystal lattices and those which are "substitutional" in that they take the place of solvent atoms in the lattice itself. Slags generally contain a high proportion of silica together with lime or other compounds in accordance with the function required. They are mainly of concern in the liquid state and, as in these systems the changes between the liquid and the solid are only ones of degree, studies of the latter state at ordinary temperatures can give most of the information required.

Atomic Structure of Oxides

The oxides of iron are a particularly interesting group of compounds, the ferrous showing an unexplained refusal to accept a stoichiometric* amount of iron compared with the oxygen. There are never less than 5 per cent., and sometimes up to 15 per cent. of the iron atoms missing, leaving vacant holes in the crystal lattice. These holes play an important part in the kinetic and diffusion processes associated with the reduction of this oxide. The magnetic oxide of iron has the interesting characteristic of being almost a metallic conductor.

The most serious problem encountered by scientists was that of refractories. While it was generally easy to use a material such as alumina in the presence of liquid iron, or molybdenum in the presence of liquid slags, provided the oxidation or reduction characteristics of the system were inside certain ranges, it became extremely difficult to study both the slag and the metal together, as a material compatible with one was incompatible with the other.

A short outline was given of some of the applications of reaction kinetic studies to problems concerned with steel making. It was shown that at the higher temperatures of liquid steel, simple chemical reactions could not be limiting factors because the rates calculated from the collision frequency and the energy of activation gave values much higher than those observed. Usually, this was explained by a diffusion process being the rate-determining factor. At lower temperatures, in certain cases, the laws of reaction kinetics were found to be fully applicable.

The lecturer showed how the science of thermodynamics had become of fundamental importance to the study and control of metallurgical reactions. Fortunately, it seemed now possible to meet most of the requirements by the simplest form of thermodynamics, using the concept of chemical potential solely in relation to single species and to the partition of a species between two or more phases. The most important of these is the oxygen potential and the primary iron- and steel-making processes were shown by diagrams on this basis. It was hoped to follow this development by the introduction of a simple means of calculating quantitative changes on the basis of the capacity of a particular phase to accept a given species at a particular temperature.

The speaker concluded by pointing out that a physical chemist coming into this field would have to re-examine his outlook towards various concepts which might have become too firmly ingrained if he had only been interested in phenomena at lower temperatures. For example, stoichiometry is found to be the exception rather than the rule, and the concepts of valency, molecules, ions, etc., require re-defining.

*Appertaining to the science of estimating atomic weights.

New Catalogue

New and Second-hand Machinery. It was somewhat difficult to find a suitable category in which to place a voluminous catalogue recently issued by the "600" Group of Companies. Within this group, headed by George Cohen, Sons & Company, Limited, Wood Lane, Shepherds Bush, London, W.12, are more than a dozen concerns operating from a like number of industrial centres. A loose-leaf cover bound in a steel spiral has been used to carry about 130 pages. It has a light grey chequer-board design, ornamented by a gold-bordered plaque depicting the group's well-known trade mark. The backs are perhaps a little too light in colour to remain presentable after a lengthy storage in the average works' office. Good use has been made of illustration and the layout of the various pages is excellent, with the exception of the illustrations of the band saws, where resort has been made to a much greyer ink for printing. There is something very impressive in exploring, through the medium of such a catalogue as this, the great resources and diverse manufactures correlated into one huge group. One finds briquettes of tin sponge from old tin cans, steel castings, wireless aerials, mobile cranes, band saws, to cite but a few of the items listed. Recipients of this catalogue cannot help but find much of both general and particular interest.

THE ANNUAL REVIEW OF PROGRESS, registered in 1948, by the General Electric Company, Limited, states that investigations into high-frequency baking of foundry sand cores, in collaboration with Morris Motors, Limited, have yielded promising results. The saving of time and floor space is appreciable.

Metal on Wooden Pattern Boards

By "Checker"

Wooden pattern boards are extensively used in the foundry for mounting patterns which are to be used in the production of castings by machine moulding. Although these plates or boards are usually made in hardwood, the moulding-box parts wear a considerable groove in the working face if some means of protection is not applied.

To counteract this tendency to wear, metal pieces must be let into the wooden plate to give the necessary resistance. These metal pieces, usually mild steel ⅛ in. to ¼ in. thick, can be positioned level with the surface of the wood at each corner, as shown in Fig. 1. If, however, considerable wear be anticipated, it would be better to use strips approximately 1 in. to 1½ in. wide. Such strips should be positioned as shown in Fig. 2, so that they come in contact with the complete face of the moulding boxes. In all cases these metal pieces are secured to the boards by screws.

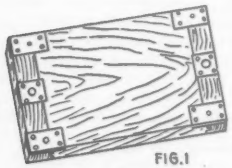


FIG. 1

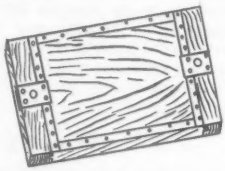


FIG. 2

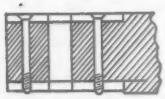
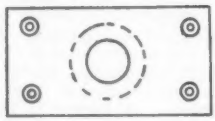


FIG. 3 (a)



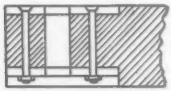


FIG 3. (b)

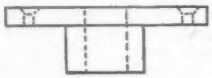


FIG. 4

The plate at each end has a hole drilled in to carry the moulding-box pins, and these must be bolted in position to guarantee accuracy; for this purpose a metal plate must be incorporated on the underside; these can be held together by tapped holes in the bottom plate (see Fig. 3 (*a*)), or by nuts and bolts as shown in Fig. 3 (*b*), the ends of the bolts being riveted over to overcome the tendency for the nuts to become loose. In both instances it is preferable to recess the board sufficiently to keep the bottom plates clear of the back face of the board.

On large plates it may be advisable to have a cast plate for the top portion, as shown in Fig. 4, comprising a square or oblong portion with a substantial boss underneath, which, if made a good fit in the wood board, gives extra support against any possible movement from the correct position. Bottom plates would, of course, still be required for securing it in position.

Book Reviews

Palmer's Company Guide (36th Edition). By J. Charlesworth, LL.D. Published by Stevens & Sons, Limited, 119 and 120, Chancery Lane, London, W.C.2. Price 6s. 6d.

A book which has reached 36 editions obviously commends itself, yet because of the mad rush of modern legislation, it is essential that those interested in company law should be able to consult an up-to-date work of reference. As recently as July 1 this year a new Act came into force, and information about this has been incorporated.

La Pratique des Traitements Thermiques des Métaux Industriels (Practical Heat Treatment of Industrial Alloys). By Gérard de Smet. Published by Dunod, 92 rue Bonaparte, Paris VI. Price 960 francs.

This is the third edition to be printed, which is an obvious testimony to the popularity of the book in France. To expound his subject, the author has presented a review of the simple metallurgical background to each group of alloys. Thus the final outcome has been an elementary textbook on metallurgy with stress laid upon heat-treatment. The book is roughly divided into two parts—ferrous and non-ferrous, plus furnaces, pyrometry and testing. In the first section, heat treatment only begins at Chapter VI and ends with Chapter IX devoted to nitrogen hardening. In the non-ferrous section there is a wider interspersal of heat-treating data with general metallurgical information. The reviewer criticises strongly the publication of microphotographs without any indication of the magnification. A mistake requiring correction is the statement that metal for Meehanite crankshafts is melted in the electric furnace. Despite these lapses, the book would make a splendid textbook for technical colleges teaching metallurgy if it were available in English.

V. C. F.

The Heat-Treatment of Foundry Bronzes

(*Continued from page* 600.)

It seems likely that this application of heat-treatment is worthy of more consideration in practice than it has received so far, since the temperatures involved are not high enough to have harmful effects on the structure or wearing properties of the castings.

Acknowledgments

The research described in this article was carried out in collaboration with the Tin Research Institute and the Author's thanks are due to several members of the Institute's staff for help with the experimental work.

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Notes from the Branches

Birmingham, Coventry and West Midlands

The Garrett Report

This branch held a meeting at the Wolverhampton Technical College in October, when Mr. John Gardom gave a talk on the Garrett Report. Mr. Gardom outlined the principal features of the report and illustrated certain recommendations by use of lantern slides.

DISCUSSION

The BRANCH-PRESIDENT (Mr. J. Hird) said he was sure everyone had listened with very great interest to the talk and, on behalf of the members present, asked Mr. Hughes to propose a vote of thanks to Mr. Gardom.

MR. HUGHES said many of the ironfounders, as the lecturer had mentioned, had been endeavouring to carry out the suggestions in the Garrett Report, and the very apt remark made by Mr. Gardom was to be recommended, *i,e.*, " It should be realised that to carry out a large number of the improvements recommended, there must be close co-operation between employers and employees." It would be agreed that from time to time it was disturbing to find that, although great efforts were made to effect improvements in the foundry, the employees had not troubled to take advantage of these, and managements had got disheartened and tended to be disinterested.

Popularising Amenities

In seconding, MR. MCKENZIE said he was in the position of having to operate a new foundry; the dressing shop was not yet built, and he thought he would like to put forward a design similar to the Qualcast design shown on the screen. Referring to colour schemes in foundries having effect on production, *etc.*, Mr. McKenzie wondered if colour would affect the life of moulders. In the new foundry he would have a section where ashes would be kept and he felt this was necessary in the interests of tidiness. Referring to the need for washing facilities, they had recently taken over a place where the moulders could wash and put away their clothes, but the men did not seem to want such facilities, and preferred to have their clothing hanging where it could be seen.

MR. GARDOM thanked the speakers and, reverting to the remarks on washing facilities, felt that to get the men to take advantage of these, someone should be detailed to look after this section. He was aware of cases of damage to such equipment, but had found that, in general, people appreciated and preserved good materials, and the report recommended the purchase of high-class equipment and not the cheaper quality. On the subject of the photograph of the Qualcast dressing shop, Mr. Gardom said this showed the type of building that could be used for such work. Replying as to colour schemes in foundries, Mr. Gardom said it should not be overlooked that the mortality of moulders was fourth on the list of any trade, and that they generally enjoyed long life. He agreed with Mr. McKenzie that it was the general tendency for the workers to require their clothes in sight, but thought it might be possible to have the locker system at a point where they could be seen by the workers.

Dust Removal

MR. HIRD referred to the remarks made by Mr. Gardom to the " hen-coop " arrangement on the top of their cupolas, which Mr. Hird said was most effective for clearing small cinders which were blown out of the cupolas. It was cleared every week. He had recently installed a vacuum cleaning plant, which had been tried out during working hours, but as it was the butt of many lively remarks to the effect that it was in the way, and caused more loss of time, he had put it to work on the night shift, where it was very satisfactory. There was, of course, the trouble of the accumulated dust on walls and girders, *etc.*, and it took some time to get round the foundry with the equipment.

MR. GARDOM thanked Mr. Hird for his remarks and confirmed his views on the vacuum cleaner method of cleaning walls, but advised against trying to use it to clean foundry floors. Another recommendation in the Report was the consideration of the use of vacuum to clean dirt from moulds, instead of the usual practice of blowing out. In some cases this had proved effective, but was not so when applied to deep flanges, *etc.*, in a mould.

MR. HIRD said he had had the idea of aspiration instead of blowing, and had used the small vacuum cleaner such as used by electricians, with a rubber end, but there was insufficient suction for it to be effective.

MR. SIDDENS asked if Mr. Gardom would recommend board and slatted roofs for foundries, and also whether there was a danger of rain coming through the type of roof made by the Hills Patent Glazing. He would also like to ask what percentage of men used the washing equipment, and the size of the installation.

Replying to Mr. Siddens, MR. GARDOM said he would recommend a board and slatted roof if it could be obtained. It had a good insulation and was a proposition totally different to corrugated sheets where the steel came to the eaves and let in the air. Hills Patent Glazing did not let in the rain; he had seen them partially open during very heavy rain and the rain did not come through. On the subject of bathing equipment, Mr. Gardom said the report recommended that one bath should be supplied between ten men, and it was a good idea to stagger the time for the use of the baths, and thus cut out heavy capital expenditure. Generally, the men were circularised asking if they would use the bathing equipment if installed, and usually a small installation was fitted up with the intention of building more if required. Extensions had already taken place in five different concerns, and it appeared that the younger men were keen to take advantage of the facilities.

Heating and Ventilation of Foundries

MR. SHOTTON, complimenting Mr. Gardom on his talk, said that the Garrett Report appeared to be a logical document. One of the biggest problems in the foundry seemed to be the provision of suitable means of heating and ventilating the shops, particularly in

The Garrett Report—Discussion

shops having highly mechanised units, and others of a jobbing character doing batch-type moulding where the floor area was greater. Obviously, there was difficulty in providing heating arrangements to heat the incoming air and the shop air. He wondered if Mr. Gardom could give a figure for the time interval for completely changing the air in a foundry.

MR. GARDOM said he could not give a figure for the time interval; this subject had been brought up in discussion during the preparation of the Report, but not included in the document. He had been talking about buildings housing about 50 people, but in the foundry there was probably only one or two men in the same area. He felt this was ridiculous considering the man in the foundry had often got about 50 sq. ft. of space to work in, as against a machinist with only 6 or 8 sq. ft. He felt that ventilation was not really a serious matter, but he agreed that heating was serious because of the necessity of getting an even temperautre.

MR. HIRD, referring to the Hills Patent Glazing, said he thought it very effective, but would be more so if it could be arranged to open both ways to cope with the direction of the wind and so bring under control the tendency of blowing down.

MR. MORGAN, referring to the last point, said that at his firm they had arranged the roof in 20-ft. sections opening in opposite directions and, by opening both partially, a "U" trough of air was obtained; according to direction of wind, they could close down the appropriate section.

MR. GARDOM thanked Mr. Morgan for his remarks; he had not thought of that solution.

Views of the Factory Inspector

MR. GALE said that Mr. Gardom had mentioned that the recommendations may perhaps become law, and that Factory Inspectors may interpret the recommendations as law when they call upon the foundries to discuss the various points. He had already had a call from the Inspector on this matter, and the Inspector had taken a long time to go through every aspect of the Report. Quite a lot of the items were recommendations. Mr. Gardom had mentioned clothing lockers, and this point had been mentioned by the Inspector, who agreed that racks were sufficient to cover the present law, but the Inspector took a poor view of racks. Even those mentioned by Mr. Gardom, which were hoisted up into the air, were not satisfactory, as the clothing collected the foundry dust, and it seemed to him (Mr. Gale) that the only satisfactory method was the locker system. Another point mentioned was the foundry floor. He preferred a concrete floor, which was swept clean daily, but when metal spillages occurred, the small pebbles of metal on a smooth concrete floor could create a danger of skidding and so cause accidents. The Factory Inspector had raised this point and had referred to foundries who deliberately scattered sand on the floor to offset the danger of metal pebbles. Could Mr. Gardom express his opinion on this subject?

MR. GARDOM agreed that lockers were much better than clothing racks. It was, however, a big expense to provide these. It was usual to start with a few for, say, the furnacemen or the fettlers, and it was generally found that others would want them, and so the system would be built up gradually. Regarding floors, he was absolutely in favour of sweeping the concrete floors. There should not, of course, be metal spillages, but even considering these, he had seen more danger of accident on sand floors than on clean-swept concrete floors.

Dust Extraction from Portable Tools

MR. LUNT referred to a process of fettling alloy castings at his works. and spoke of complaints from inspectors on the fact that the benches were not fitted with dust-extraction plant. The castings were cleaned with hand-operated, compressed-air dressing wheels, and he wondered if Mr. Gardom could suggest a suitable work bench for this job.

MR. GARDOM, in reply, said the usual thing was to have a bench with a grill and a hopper fitted underneath and extract the dust that way. The trouble with this method, however, was the noise. There was a small paragraph in the Report on noise. In his opinion, noise was worse than dust.

MR. HIRD said that his firm had supplied their men with clothing lockers. They were an expensive item, and so he had got sanction to order 50 a month. As the first 50 came in, the men saw and approved, and he received requests for further lockers. It had taken about 10 months to supply everybody. He was of the opinion that it had been worth the expense of putting in the equipment. On the subject of concrete floors, he preferred to see them with a rough finish and not smooth, so that, if there were any spillages and consequently small pellets of metal, the men did not skid on the pellets, as these were caught in the ridges of the floor. Smooth floors he considered to be dangerous.

BRITISH RONCERAY, LIMITED, of 87, Fargate, Sheffield, in response to our inquiry, inform us that, generally speaking, they are not in a position to supply spare parts for Bonvillain & Ronceray foundry plant delivered before the war, but if any spare parts are required, it is not thought that there would be any great difficulty in obtaining import licences for these. A major snag likely to arise is that the pre-war plant has now been superseded by new designs and the French company may not have the required parts in stock. The company also informs us that arrangements have been made for the production in this country of one model of the Bonvillain & Ronceray moulding machines, that known as the SPD.350. This is a jolt squeeze, vibrated squeeze, down-draw strip machine of 800-lb. capacity. The table is 18 in. by 24 in. and the draw 8 in. .No other large machinery is in view at the moment and, moreover, there will not be many SPD.350's completed in 1949. A few small accessories made to the French company's design are being put on the market in the first six months of 1949, notably the blow gun and their automatic air supply line lubricator. Finally, the manufacture of the American Redford cartridge-type core blower is being undertaken, but in the early stages supplies will be rather limited.

E.R.P. Funds Misuse Alleged by E.C.A.

"Complaints do not Apply to Britain," says M.O.S. Spokesman

The Economic Co-operation Administration on December 14 accused Britain, Belgium and the Netherlands of using Marshall plan funds to buy aluminium and lead, some of which they resold as scrap at a profit to American firms. As a result, Mr. Howard Bruce, the deputy administrator, said requests of all participating countries for non-ferrous metals had been cut by 34,500 tons. The E.C.A. statement said that the United Kingdom bought 81,326 tons of aluminium with E.R.P. funds up to September 30, and re-sold 12,812 tons to American firms. During the same period the Netherlands bought 3,440 tons, of which 2,368 tons were re-sold; and Belgium, up to the end of October, bought 2,250 tons, of which 673 tons were re-sold. The aluminium was bought in Canada at 16 cents a lb., and re-sold here as scrap at prices up to 27 and 30 cents a lb. Britain was not involved, according to the E.C.A., in the lead transactions.

A Ministry of Supply spokesman has denied the E.C.A. allegations. "These complaints do not apply to Britain," he said. "So far as lead is concerned, the export of lead or lead scrap from Britain is prohibited, and Britain has sold no lead scrap nor lead to the United States. So far as aluminium is concerned, the export of virgin aluminium from Britain is prohibited and none has been sold to the United States. Similarly, the export of aluminium scrap from Britain is prohibited and none has been sold to the United States. But very small quantities of secondary aluminium—that is, remelted scrap—have been sold to the United States in strictly limited quantities on quota to enable smelters to retain pre-war markets. The total quantity so exported from Britain to the United States in 1948 is about only 1,000 tons.

"During the past year," the spokesman concluded, "repeated requests have been made by large American firms to Britain to permit export of secondary aluminium from Britain to the United States, but these have all been refused."

Mr. Howard Bruce, acting Marshall-plan administrator, announced in Washington on December 15 that the cuts made in requests by Britain and other countries for aluminium and lead, because of alleged misuse of these supplies, will be restored if the charges prove false.

A FACTORY, owned by Thorns Electrical Industries, Limited, at Hirwaun Trading Estate, Glamorgan, which entirely employs disabled men, is to close at the end of this month. The manager of the firm has stated that 60 men would be put out of work. Trade was bad in the industry, and competitors of the firm employed girls, whom they paid 30s. a week less than disabled men received, he said. The A.E.U. is reported to have appealed to the Prime Minister about the matter.

Recent Shipbuilding Orders

The following are among shipbuilding orders recently announced:—

VICKERS-ARMSTRONGS, LIMITED, 24,500-ton motor tanker for Norwegian owners.

JOSEPH L. THOMPSON & SONS, LIMITED, Sunderland, two motor tankers of 15,000 tons dw. for Norwegian owners.

ALEXANDER STEPHEN & SONS, LIMITED, Glasgow, 8,000/9,000-ton cargo vessel for the New Zealand Shipping Company, Limited.

LITHGOWS, LIMITED, Port Glasgow, a motor tanker of 13,500 tons dw. for the United Steam Navigation Company, Limited, Newcastle-upon-Tyne.

GRANGEMOUTH DOCKYARD COMPANY, LIMITED, a motorship of 1,100 tons dw. for Empresa Insulana de Navegacao, Lisbon, and a motor collier of 1,500 tons dw. for Stephenson Clarke, Limited.

BURNTISLAND SHIPBUILDING COMPANY, LIMITED, Fife, two self-trimming motor colliers, each of 2,700 tons dw., for the London Power Company, Limited, and two self-trimming motor colliers, each of 4,000 tons dw., one for Scheepvaart en Steenkolen Maatschappij N.V., Rotterdam, and the other for the Shipping & Coal Company, Limited, London.

Equipment for Welsh Steelworks

Big Order for Davy & United Engineering

The Steel Company of Wales, Limited, has placed further big contracts in Sheffield for rolling-mill equipment and auxiliary machinery, making the total value of the business placed more than £1,500,000. The successful firm is Davy & United Engineering Company, Limited, whose original contract, placed some months ago, was of the value of £1,000,000. The latest bookings are for a four-high reversing cold mill for cold rolling silicon steel strip, a feature of which, it is stated, is that it is designed to roll up to a maximum width of 42 in. at speeds up to 1,000 ft. per min. The estimated output is up to 900 tons of silicon steel strip a week of 126 hrs. It is understood that the installation will make it possible for the first time in this country to roll this type of steel strip in widths of over 24 in. on a standard four-high mill. Narrow silicon steel strip has previously been rolled in British steelworks.

The mill will be equipped to cold roll, as an alternative product, mild-steel strip at speeds, it is reported, up to 1,250 ft. per min., the estimated output being 1,250 tons a week of 126 hrs.

AS THE RESULT of business contacts with the foundry industry, it became evident that a Bantam wire-shearing machine with a capacity for cutting ¼-in. soft iron core wire was required in addition to the standard machine which cuts $\frac{1}{8}$ in. The makers are therefore putting on the market a Model MX for the larger wire.

News in Brief

THE FIRST NATIONAL Exhibition of Industrial Finishing to be staged in Great Britain will be held at Earls Court, London, from August 31 to September 13, 1949.

A SIAMESE PURCHASING MISSION visited works in the Sheffield area last week. The purpose of the mission is to rehabilitate the Siamese railways, which were severely damaged during the war.

IN THE FIRST 10 MONTHS of the year, 166,143 tons of iron ore arrived at Sunderland—the highest figure since 1920 and 50,974 tons more than in the same period of last year and 115,018 tons more than January-October, 1938.

THE DIRECTORS of the Summerlee Iron Company, Limited, have decided to repay on January 12 the £150,000 4 per cent. preference in £5 shares at a premium of 10s. per share, together with dividend for the period from September 1.

NORTH BRITISH LOCOMOTIVE COMPANY, LIMITED, Glasgow, has received an order for eight Deisel electric shunting locomotives of 625 h.p. for the Ceylon Government Railway. The electric equipment is to be supplied by the General Electric Company, Limited.

C. H. BAILEY, LIMITED, marine-engine builders, dry-dock owners, and shiprepairers, of Cardiff, Barry, and Newport, Mon, has opened a new inquiry office in London at Great Eastern House, 154, Bishopsgate, E.C. The London representative is Comm. A. L. White.

EACH EMPLOYEE of J. & G. Coughtrie, Limited, manufacturing electrical engineers, of Glasgow, is accredited with 1s. each day he clocks in on time. If, over the five-day week, he earns the maximum of 5s., he is credited with a further bonus of 7s., making a total of 12s. a week.

TWENTY-NINE EMPLOYEES of the Gartcosh, Milnwood and Mavisbank works of Smith & McLean, Limited, sheet and bar rollers, of Glasgow, received presentations in recognition of long service on December 8. The presentations were made by Sir John Craig, chairman of the company.

BECK & POLLITZER, LIMITED, has formed a subsidiary in South Africa under the style of Beck & Pollitzer (Africa) (Pty.), Limited, with the head office at Johannesburg. The new company is operating as shipping, clearing and forwarding agents, and specialists in the handling of heavy plant and machinery, etc.

THE FIRST general meeting of the newly formed Metropolitan branch of the Engineers' Guild was held on December 1, when members heard a talk by Mr. R. M. Wynne-Edwards on the aims and objects of the Guild. It has been decided to establish a West Midland branch of the Guild with headquarters in Birmingham.

P. & W. MACLELLAN, LIMITED, Glasgow, is building an aluminium footbridge, stated to be the first of its kind in Scotland, for the North of Scotland Hydro-Electric Board for erection at Pitlochry to span the Tummel. The bridge will be made of special light-weight alloy, designed and rolled for structural purposes.

THE ANNUAL MEETING of Richard Hill & Company, Limited, steel wire rod rollers, wire manufacturers, etc., to be held at Middlesbrough on December 29 will be adjourned, and the adjourned meeting will take place in London on January 4 so that stockholders residing in the London area may have an opportunity of discussing the company's affairs.

DUNSTON POWER STATION is to be one of the pioneer stations in the country to develop electrical power with a gas turbine. A 15,000-kw. set, on order from C. A. Parsons & Company, Limited, Newcastle-upon-Tyne, is designed to operate with an initial gas temperature of 1,200 deg. Fahrenheit. Similar units are to be installed at Manchester and Dundee.

FLETCHER, HOUSTON & COMPANY, LIMITED, iron-founders and engineers, of Tipton, Staffs, plans to acquire the issued share capital of Carlton Motor Stampings, Limited, Tipton, Staffs, for £88,750. Of the purchase consideration £43,750 will be satisfied by the allotment of 250,000 1s. shares in the Fletcher company at 3s. 6d. each and the balance by cash.

MACKENZIE METCALFE ENGINEERING COMPANY, London, W.1, is to design a large metallurgical plant in Yugoslavia under an agreement with the Yugoslav Ministry of Heavy Industry. The company has also undertaken to give the Ministry practical assistance in preparing plans for the extension of the country's iron and steel industry under a five-year plan of industrialisation.

THE BRUSH ELECTRICAL ENGINEERING COMPANY, LIMITED, Loughborough, and J. & H. McLaren, Limited, Leeds, have signed a further contract with the trade delegation of the U.S.S.R. for the supply of 2,850 standard self-contained 50-kw. Diesel generating sets. The contract, which is valued at over £5½ million, is among the largest ever to be placed for a standard range of Diesel generating plant.

THE BRITISH METAL CORPORATION, LIMITED, a subsidiary of the Amalgamated Metal Corporation, Limited, has acquired the entire share capital of Norman Hill & Company, Pty., Limited, Sydney, merchants in non-ferrous metals, ores, concentrates, residues, scrap, etc. Application is being made for the necessary authority to change the name of the company to the British Metal Corporation (Australia) Pty., Limited.

JARROW TUBE WORKS, LIMITED, is to reorganise to meet the requirements of the British Electricity Authority for seamless steel boiler tubes for new generating stations. Substantial contracts have been accepted and a major replanning of the factory lay-out will take place in the next few months in readiness for production next spring. Output is expected to rise from 14,000 tons of steel a year to 20,000 tons, but because of the heavier class of work and the fewer processes involved, it is possible that a small number of workers may be dispensed with.

FORTY-FIVE TONS of fabricated steel supplied by Dorman, Long & Company, Limited, and an electric propulsion turbine with a peak power of 9,000 h.p., made by the General Electric Company, Limited, will be embodied in a stator which is shortly to be installed in the 15,000-ton tanker San Silvestre, now being completed at the Haverton Hill-on-Tees yard of the Furness Shipbuilding Company, Limited. She is the first turbo-electric-driven vessel built on the Tees and is one of three ordered from the Furness Shipbuilding Company by the Eagle Oil & Shipping Company.

Company News

(Figures for previous year in brackets.)

LYON & LYON—Interim dividend of 5% (same).

BUTTERLEY COMPANY—Interim dividend of 3½% (same).

AIRSCREW COMPANY—Interim dividend of 15% (same).

FARROW & JACKSON & PURDY—Interim dividend of 6% (same).

BRITON FERRY STEEL COMPANY—Interim dividend of 5% (same).

AMBROSE SHARDLOW & COMPANY—Interim dividend of 2½% (same).

MARSHALL, SONS & COMPANY—Final dividend of 11¼%, making 15% (same).

BRITISH INSULATED CALLENDER'S CABLES—Interim dividend of 2% (same).

CROMPTON PARKINSON—Final dividend of 7½% and bonus of 7½%, making 22½% (same).

CRABTREE ELECTRICAL INDUSTRIES—Final dividend of 7½% (5% and bonus of 7½%), making 17½% (same).

FLETCHER, HOUSTON & COMPANY—Dividend of 40% (30%). The company was made public last February.

BRITISH ELECTRIC TRANSFORMER COMPANY—Dividend of 76.6% (70%) and special tax-free dividend of 23.3% (nil).

WYNDHAM'S MARINE PATENTS (1928)—Loss for the year to March 31, £219 (£6,860), increasing the adverse balance brought in from £36,679 to £36,898.

SHEFFIELD TWIST DRILL & STEEL COMPANY—Interim dividend of 12½% for 1948. A dividend at the rate of 35% per annum was paid for the period October 2 to December 31, 1947. The company was made public last December.

CANADIAN CAR & FOUNDRY COMPANY—Net profit for the year ended September 30, $2,580,445, equal to $5.96 ($712,683, or 85 cents per share); special income included $538,666 net recovery from award to company's New York agency arising from war claims.

RONEO—Consolidated profit on trading to September 30, including profits from foreign branches and subsidiaries for the year to June 30, 1948, £494,000; other income, £11,032; net profit, after tax, depreciation, etc., £138,962; to general reserve, £39,500; staff pension fund, £25,000; dividends, £45,691; forward, £174,051.

WALTER SOMERS—Trading profit to March 31, £87,013 (£89,976); other income, £1,974 (£2,386); to tax, £22,750 (£31,500); depreciation, £18,215 (£21,791); net profit, £28,502 (£19,691); surplus taxation and other provisions, £8,150 (£15,000); dividend of 1s. per share, or 50% (same); general reserve, £20,000 (£15,000); forward, £62,329 (£55,460).

WEARDALE LEAD COMPANY—Proceeds from sales of lead-ore, etc., for the year to September 30, £52,968 (£29,939); stocks on hand, £3,771 (£3,208); to stocks at September 30, 1947, £3,208 (£3,456); expenditure, £43,654; office, etc., expenses, £416; directors' emoluments, £903; audit fee, £52; profit for the year with sundry income, £8,726 (£7,446); to depreciation, £3,508; taxation, £750; dividend of 10% (5%); forward, £4,705 (£2,929).

RICHARD HILL & COMPANY—Trading profit to September 30, £183,309 (£110,485); to directors' fees, £500 (same); depreciation, £9,684 (£9,889); deferred repairs, £2,208 (nil); tax, £90,000 (£52,000); appropriation to write down fixed assets, nil (£20,000); leaving £90,917 (£28,096); brought in, £27,442; to additional directors' fees, £1,000; dividend of 20% (same); fixed assets replacement, £67,791 (nil); forward, £24,006.

BERTRAMS—Trading profit to September 30, £132,194 (£72,871 after tax); other income, £2,958 (£2,077); to depreciation, £3,000 (£2,000); directors' emoluments, £5,907 (£2,189 fees); taxation, £60,000; provident fund, £7,500 (general office expenses, £29,874); net profit, £58,745 (£40,886); to improvements, etc., £25,000 (same); reserve, £25,000 (£5,000); dividend of 20% (15%) and bonus of 5% (same); forward, £8,523 (£6,950).

ANTI-ATTRITION METAL COMPANY—Group manufacturing profit to July 31, £51,013; interest, etc., £914; to auditors' remuneration, £630; depreciation, £13,903; leaving £37,394; parent company's balance, £36,757 (£39,832); reserves no longer required, £4,663 (nil); brought in, £16,390 (£5,058); available, £57,810 (£44,890); to superannuation, £500 (same); tax, £17,750 (£1,000); dividend reserve, £2,500 (£5,000); dividend of 10% (same); forward, £15,060.

ELSWICK HOPPER CYCLE & MOTOR COMPANY—Balance from trading account for the year to July 31, £98,007 (£72,691); other income, £947 (£1,081); to directors' fees and other emoluments, £5,450; depreciation, £4,449 (£5,735); net profit before tax, £89,055 (£66,286); to taxation, £44,060 (£39,938); general reserve, £25,000 (£15,000); depreciation and obsolescence reserve, £2,500 (nil); dividend of 12½% (same); forward, £15,947 (£7,234).

STEWARTS AND LLOYDS OF SOUTH AFRICA—Trading profit for the year to June 30, £728,022 (£341,930); profit in respect of previous years, £10,534 (nil); profit on realisation of non-trading assets, £3,134 (£38,542); over-provision taxation, nil (£13,302); dividends £8,493 (same); to taxation, £227,500 (£95,000); depreciation, £68,725 (£63,720); net profit, £434,823 (£223,576); dividend of 10% (same); general reserve, £200,000 (£100,000); stock reserve, £66,091 (nil); forward, £138,407 (£87,176).

BRITISH TABULATING MACHINE COMPANY—Net profit for the 53 weeks to September 29, after depreciation, directors' remuneration, etc., £144,951 (year £128,822); to profits tax, £30,000 (£21,000); income tax, £51,000 (£44,000); debenture issue expenses, £3,752 (nil); issue expenses and capital duty, nil (£12,068); revenue reserves, nil (£10,000); preference dividends, £13,200 (£8,800); final ordinary dividend of 10%, making 17½% (same), £43,312 (£30,937); forward, £37,701 (£34,014).

SUN ELECTRICAL COMPANY—Trading profit, etc., to April 30, £114,094 (£74,674); to depreciation, £3,435 (£1,665); amortisation, £3,100 (£1,950); audit, £289 (£210); repairs, nil (£4,500); directors' fees, £2,100 (£1,500); salaries, commissions, etc., £16,688 (£13,996); income tax 1949-50 £35,500, profits tax 1947-48 £11,500, making together £47,000 (£28,367); net profit, £41,482 (£22,486); further provision for income tax on profits to April 30, 1947, £12,500 (nil); to reserve, £11,500 (£7,500); dividend of 7½% (same); forward, £16,602 (£8,125).

JOHN HOLROYD & COMPANY—Group trading profit to September 30, £402,276; to plant replacement reserve, £50,000; depreciation, £54,141; directors' remuneration, £21,000; auditors' fees, £999; profits tax, £37,150; income tax "A," £1,401; income tax "B," £130,650; leaving £106,935; parent company's balance, £69,049 (£42,605); brought in, £99,051 (£72,946); from contingencies reserve, £51,000 (nil); available, £219,100 (£115,551); to general reserve, £141,000 (nil); stocks reserve, £25,000 (nil); dividend of 20% (same); forward, £36,600.

DRAKE & GORHAM—Trading profit for the year ended June 30, £17,346 (£9,006); rents received, £2,836 (£2,681); investment income, etc., £262 (£371); dividend from subsidiary, £12,636 (£15,985); to directors' fees, £1,600 (£597); depreciation, £3,324 (£3,151); patents written off, £22 (£65); deferred repairs, £1,419 (£1,882); legal expenses, £253 (£370); share issue expenses, £99 (£2,206); taxation, £11,686 (£14,385); debenture interest, nil (£11); net profit, £14,676 (£5,475); to preference dividend (on increased capital), £2,131 (£946); ordinary dividend of 5% (same); forward, £36,692 (£31,297).

DARWINS—Consolidated trading profit to March 31, £117,474; other income, £8,263; to management expenses, £41,639; depreciation, £39,071; cost of valuation fixed assets, £4,241; staff assurance, £7,593; directors' fees, £1,394; aggregate directors' emoluments: as directors £1,394, other emoluments £13,266; compensation to a director, £2,000; income tax on profits of Darwins, £4,250 (Note—No liability to income tax arises on profits of subsidiaries by reason of capital allowances brought forward); net profit, £25,549; preference dividend, £5,849; dividend on ordinary shares of 6%, £16,967; forward, £14,186.

MOSS GEAR COMPANY—Trading profit to August 31, £483,021 (£245,401); interest, etc., £927 (£710); to depreciation, £61,854 (£56,388); directors' emoluments, £32,607 (£20,452); E.P.T., nil (£25,000); audit, £420 (£315); net profit, £394,067 (£143,956); estimated net E.P.T. refund, £10,000 (nil); to profits tax, £52,500 (£20,000); income tax, £157,500 (£62,500); general reserve, £100,000 (nil); plant replacement reserve, £20,000 (nil); off freehold land and buildings, £10,000 (nil); additional depreciation, £17,742 (nil); dividend and bonus of 25% (same); special bonus of 5% payable out of E.P.T. refund, £6,600 (nil); forward, £102,335 (£100,560).

SAMUEL OSBORN & COMPANY—Consolidated profit and loss account for the year to July 31 shows: Trading profit, £565,218; income from investments, £66,182; to depreciation, £45,196; directors' emoluments, £17,000; audit fees and mortgage interest, £1,614; taxation, £283,044; deferred repairs and rehabilitation, £28,472; preliminary expenses, £268; net profit retained by subsidiary companies—shares outside group £2, attributable to group £116,779; balance to appropriation account of parent company, £139,025; to preference dividend, £7,183 net; final ordinary dividend of 12½%, making 15% (same); forward, £265,280 (£157,612).

WAILES DOVE BITUMASTIC—Trading profit to September 30, £141,320 (£120,950); interest, etc., £3,134 (£3,900); other income, £267 (£516); to building and machinery depreciation, £6,930 (£3,505); deferred repairs, £528 (£3,774); directors' emoluments, £10,703 (£7,615); audit fee, £428 (£427); tax, £65,744 (£56,297); leaving £60,388 (£51,748); transferred from provision for foreign debts, etc., £1,000; litigation costs recovered, £2,605; to written off goodwill, patents and trade marks, £15,000 (£10,000); written off demolished buildings, £4,000 (nil); staff pension, £5,000 (same); general reserve, £15,331 (£10,000); final dividend of 17½% (15%), making 25% (22½% and bonus of 2½%); forward, £14,700 (£14,100).

CHARLES ROBERTS & COMPANY—Consolidated profit and loss account for the year to March 31 shows:—Trading profit, including wagon hiring, £385,899 (£535,854); other income, £36,773 (£12,275); to taxation, £189,417 (£263,768); depreciation, £85,459 (£111,369); bank interest and discounting charges, etc., £8,308 (£4,753); debenture interest, £12,939 (£17,254); net profit of group, £126,549 (£150,985); profit not arising from normal trading activities, £101,693 net (nil); provision for taxation in previous years not required, £65,006 (nil); dividend of 30% (same, plus a 3⅛%, tax free, capital distribution); debenture stock sinking fund, nil (£6,878); deferred repairs, nil (£20,000); pensions, £10,000 (£20,000); accumulated profit of subsidiary, now in liquidation, transferred to and included in estimated surplus on liquidation, £161,953 (nil); forward, £206,355 (£182,238).

INDIAN IRON & STEEL COMPANY—Sales of pig-iron, castings, coke, coal, etc., to March 31, £5,754,437 (£2,962,618); sundry income, £360,415 (£203,080); from Steel Corporation of Bengal, £5,822 (£33,781); dividends and interest, £42,051 (£44,576); stock, work, etc., £2,633,046 (£1,955,756); to stock, £1,955,756 (£1,147,775); raw materials and stores, £3,471,051 (£2,014,685); manufacturing, £170,357 (£128,108); salaries, £1,922,356 (£1,152,749); freight and insurance, £352,402 (£207,531); repairs and renewals, £71,644 (£48,781); net balance, £852,205 (£500,182); to coal bonus, retiring gratuity, profit sharing, provident funds, £122,055 (£65,421); debenture service, £81,991 (£81,371); depreciation, £225,000 (£150,000); commission, remuneration, etc., £56,540 (£41,356); taxation, £217,500 (£97,500); balance, £149,119 (£64,534); dividend of 12 annas per share; forward, Rs.2,44,657/-.

S. SMITH & SONS (ENGLAND)—Group profit to July 31, after deduction of emoluments of directors of S. Smith & Sons (England) to the extent of £52,727, £1,138,624 (£914,262); income from investments, £846 (£2,303); interest on tax certificates, £3,655 (£4,537); sundry interest, £6,151 (£5,829); depreciation, £188,254 (£151,644); interest on notes, £6,465 (£7,210); audit, £5,863 (£5,600); sundry provisions, £90,850 (£75,969); profit, £857,844 (£686,508); provision for profits tax, £143,000; income tax, £463,000; net profit, £231,844 (£277,080); provisions no longer required, £266,791; to taxation, £198,950; making £319,685 (£277,080); to minority holders, £1,917 (£996); consolidated net profit, £317,768 (£276,084); retained by subsidiaries, £92 333 (£140.541); net profit of parent company, £225,435 (£135,543); to research, development and contingencies, £25,000 (same); against possible fall in stock values, £50,000; pensions, £25.000; dividends on preference, £20.625; preferred ordinary dividend of 17½%, £45.368; deferred ordinary dividend of 37½%, £27.221; unappropriated, £32.221 (£17.329); brought in, £119,278 (£101,949); forward, £151.499 (£119,278). It is emphasised that the 1946-47 figures are not strictly comparable.

BRITISH ROLA—Consolidated trading profit to March 31, after trading losses and administrative expenses, £28,991 (£62,301); completion of Government contracts, £1,831 (£696); trading reserves no longer required, £1,934 (£6.742); tax no longer required, £12,780 (nil); trade investments, £395 (£248); preference redemption reserve withdrawn, £1,499 (£1,421); general reserve withdrawn, £32 (nil); brought in, £4,104 (£3,577); to directors' remuneration, £10,811 (£7,333); auditors' remuneration, £1,206 (£943); bank interest, £6.814 (£611); depreciation, £18,800 (£11.259); tax, £4.850 (£15.088); redeemed shares premium, £153 (£158); preference dividend, £2.415 (£2.487); ordinary dividend, nil (£8.663); former subsidiary inter-company debt, £6.365 (nil); preliminary expenses written off, £200 (nil); future tax provision, £15.500 (£21.200); estimated losses on subsidiaries' winding-up, £78.897 (nil); depreciation in stocks, etc., £91.097 (nil); estimated trade investment loss, £260 (nil); capital redemption reserve, £1,463 (£1,263); preference share redemption reserve, nil (£1,634); written off subsidiary premium, £32 (nil); applicable to minority interests, £598 (£577); debit to parent, £187,895 (£3,768 credit).

Obituary

MR. JOHN FORSYTH, of John Forsyth & Company, engineers and machinery merchants, of Glasgow, died on December 13 at the age of 73.

ADMIRAL PHILIP WYLIE DUMAS, of Brockham, Surrey, who was secretary of the Royal Commission on Oil Fuel and Engines, 1912-13, has died at the age of 80.

MR. GEORGE STANLEY YEARDLEY, who for 38 years was the Midland representative of William Oxley & Company, Limited, steel manufacturers, of Rotherham, died recently.

MR. ROBERT ARTHUR NORMAN, chairman and managing director of the Crown Stamping Company, Willenhall, which he founded in 1916, died on December 7 at the age of 78.

MR. JAMES HAVARD EVANS, Midland sales representative of Earle, Bourne & Company, Limited, brass and copper tube manufacturers, etc., of Birmingham, died on December 10 at the age of 79. He had been with the company for 60 years.

MR. H. LONGTHORPE, who was with the Churchill Machine Tool Company, Limited, for 37 years, died recently, aged 63. He retired last March. For the last 20 years he was responsible for the design and development of centreless grinding machines.

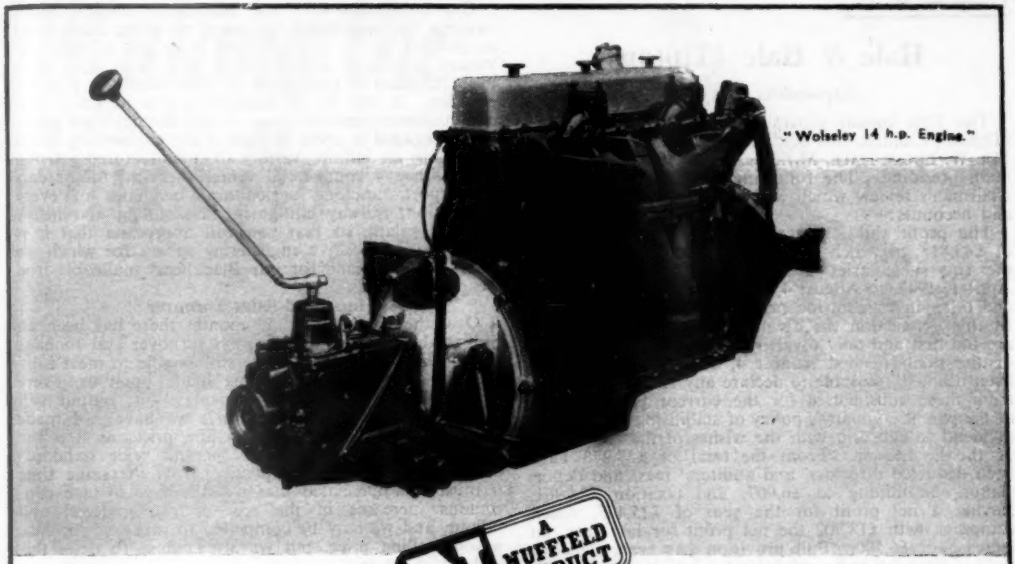
MR. ALFRED HENRY JOHN COCHRANE, a former secretary of Sir W. G. Armstrong Whitworth & Company, Limited, and a member of the River Tyne Commission from 1912 to 1927, died on December 14. Mr. Cochrane, who was born in 1865, was an accomplished county cricketer, while he was also the author of many books and articles, mainly on sporting subjects.

Wear Shipbuilding

Official returns issued by Wear shipbuilding firms disclose that half the number of ships launched from Sunderland shipyards during 1948 will have been for foreign owners. The gross tonnage of these vessels will be 73,860, an increase of 5,885 tons on last year and one of the highest export totals in Wear shipbuilding history. The entire output of Bartram & Sons, Limited, amounting to 26,673 tons gross, has been for export account.

The total tonnage launched on the Wear this year will be 177,874 tons gross, representing 38 ships, of which 19, of 121,627 tons, will be motorships. The highest individual output will be that of William Doxford & Sons, Limited, whose total tonnage for the year will be 43,505 tons gross (seven vessels). The total Wear output last year was 41 ships, of 194,114 tons gross.

COLD ROLLING MILLS, LIMITED, Newcastle-upon-Tyne, is to start production at North Shields in February. The company has bought a factory at Knitsley (Co. Durham) which has been dismantled for reassembly at North Shields. Initially, about 25 men will be employed making welded steel tubes for transformers; eventually, it is hoped, the factory will employ 250 workers.



A NUFFIELD PRODUCT

Using

STANTON-DALE

REFINED PIG IRON

USED AND RECOMMENDED
FOR ALL HIGH-DUTY
ENGINEERING CASTINGS

THE STANTON IRONWORKS COMPANY LIMITED, Nr. NOTTINGHAM

Company Meeting

Hale & Hale (Tipton)

Expanding Output

The 12th annual general meeting of Hale & Hale (Tipton), Limited, was held on December 17 at Dudley, MR. W. EDGAR HALE, M.I.Mech.E., M.Inst.F., the chairman, presiding. The following is an extract from the chairman's review which was circulated with the report and accounts:—

The profit and loss account shows a trading profit of £43,815, to which is added dividends received from the two subsidiaries in respect of the period from April 1, 1947, to August 4, 1947, amounting to £12,903, and other investment income of £555, totalling £57,273. In this connection the dividends from the subsidiaries are the first and only dividends paid, and are in respect of the period ended August 4, 1947, but it has not been deemed advisable to declare any further dividends from these subsidiaries for the current year, in view of the parent company's policy of stabilising its ordinary dividend to conform with the wishes of the Chancellor of the Exchequer. From the total of £57,273 have been deducted directors' and auditors' fees, and depreciation, amounting to £6,907, and taxation £24,961, leaving a net profit for the year of £25,405, which compares with £18,902 the net profit for last year, an increase of £6,500. Full provision has been made in the accounts for the company's liabilities to profits tax and income tax which will be assessed by reference to the profit for the year ended August 4, 1948.

Dividend of 20 per Cent.

To the balance brought forward of £13,936 has been added the net profit for the year of £25,405, making a total of £39,341, out of which have been paid the preference dividends for the year ended June 30, 1948, amounting to £3,025, and the interim dividend of 5 per cent. on the ordinary shares taking £2,750. Your directors now propose the payment of a final dividend on the ordinary shares of 15 per cent., less tax, making 20 per cent. for the year, and that an amount of £2,500 be transferred to reserve account for contingent obsolescence of buildings, plant and machinery, and £10,000 to general reserve, leaving a carry-forward of £12,816.

You will observe from the balance-sheet that fixed assets stand at £175,281, as compared with last year's figure of £162,111. This increase is brought about by the acquisition of further shares in the subsidiaries to make the company's holdings complete with the exception of one share only in each of the subsidiary companies, and further expenditure on plant and equipment, less, of course, the provision for depreciation during the year. Current assets total £144,069, and compare with last year's figure of £128,815. On the other side of the balance-sheet it will be seen that capital and surplus now amount to £303,816 and current liabilities total £82,693.

I think you will agree that the liquid position is very sound.

Our production of "fine Blackheart malleable-iron castings" is acclaimed by users as being unequalled in quality, and it is backed by a service of such advanced character as would, a few years ago, have been regarded as impossible of achievement in foundry practice. It will be of interest to you to know that our customers embrace most of the distinguished enterprises engaged in every branch of the engineering world producing an infinite variety of manufactured articles, such as heavy commercial vehicles, private motor cars for export, tractors, agricultural machines of every description, railway equipment and mining and heavy electrical plant, so that you will appreciate that it is a very comprehensive engineering sphere for which we cater. The demand for our Blackheart malleable iron steadily increases.

Increased Sales Turnover

Over the past nine or 12 months there has been an appreciable increase in our sales turnover and tonnage output, and, although we are still unable to meet fully the demands which are being made upon us, every avenue is being explored to increase our output still further. Since November, 1947, we have not made any general increase in our selling price, as it is the company's policy to maintain present price standards as long as economically possible. At the same time it must be appreciated that we still have to face continuous increases in the cost of raw material and labour, and we may be compelled to make an increase in our selling price, but we are anxious to defer this as long as we can.

We feel, however, that, apart from ourselves and similar suppliers being desirous of stablising prices, more should and could be done by the appropriate authorities to stabilise labour costs and the costs of basic materials upon which final prices depend. In the matter of exports, the maintenance of which, at high level, is so important at the present time, it is impossible, due to our position as raw material suppliers, to indicate precisely the proportion of our output which is destined for abroad, but in so far as we are able to judge, the figure would appear to be in excess of 80 per cent.

Subsidiaries

Of our subsidiary, Chatwins, Limited, it is my pleasure to report that their very distinguished line of solid-fuel appliances, including grates, ranges, domestic boilers, free standing cookers, etc., sold under the trade names of "Sunbeam," "Sunbeamette" and "Prefect," are in excellent demand, both for individual users, and particularly for the numerous municipal housing schemes. The design, quality, manufacture and finish are of the highest possible standard, and the size of the company's order-book proves beyond any question of doubt that this view is shared by a large volume of the discerning public.

J. & J. Whitehouse (Tipton), Limited, our other subsidiary, is engaged in the manufacture of a great variety of cast-iron hollow-ware, almost the whole of whose product is destined for abroad, mostly for tropical countries, and their order-book proves that the company's productions are regarded in much favour by consumers overseas.

The report and accounts were adopted.

Making the Chips fly

HOLMAN PNEUMATIC HAMMERS

are available in a range of seven sizes and include the right tool for any particular chipping or caulking work. They are high-speed tools, and the throttle valve gives the operator perfect control from light taps to full force blows.

Always in good fettle

ROTOGRINDS

These grinders range from a 4 lb. high-speed job revving at 16,000 R.P.M. to the Surface Type grinder with a 6" wheel. Included in the series is the Loco Rod Type, a special tool with a 9" wide wheel.

Hard and fast Hitters

RIVETING HAMMERS

To the famous "X" series has now been added the "ER" heavy duty group. The range now includes a tool for every job up to closing 1¼" cup rivets. And all are favourites with riveting crews.

Would you like fuller particulars of any of these tools?

Holman PNEUMATIC TOOLS

THE FIRST NAME FOR LASTING SERVICE

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Personal

MR. A. G. HOWE has been appointed to the board of Steel & Company, Limited, electrical and mechanical engineers, etc., of Sunderland.

MR. W. G. WALLACE, secretary of Sanderson Bros. & Newbould, Limited, steel and tool manufacturers, of Sheffield, has been appointed a director.

MR. MANLEY COOPER has resigned from the board of Farrow & Jackson & Purdy, Limited, brewers' and dairy engineers, of Aldgate, London, E.1.

MR. C. WALLACE SAUNDERS, for 30 years manager of the marine department of the General Electric Company, Limited, has retired. He created the department in 1918.

MR. CLARENCE JOHN MOLYNEAUX FLETCHER has been appointed senior principal scientific officer, and MR. CYRIL MINCHIN NICHOLLS principal scientific officer, of the Ministry of Supply.

COL. S. M. TATE, a director of Tube Investments, Limited, and of the Chesterfield Tube Company, Limited, has been taken ill suddenly and must rest completely for several weeks.

MR. JOHN H. SPOONER, cost accountant with Samuel Fox & Company, Limited, steelmakers and rollers, of Sheffield, is to take up a similar appointment with the United Steel Companies, Limited.

MR. J. G. BOWES, who has been appointed part-time secretary to the Halifax Chamber of Commerce, will retain his position as secretary of the Halifax District Engineering Employers' Association.

MR. THOMAS WILLIAM DAY, treasurer of the Gainsborough branch of the United Society of Boiler Makers and Iron and Steel Shipbuilders, has received a presentation in recognition of his 32 years' service in that office.

MR. R. M. PARKE, at one time director of research for the Climax Molybdenum Company, has joined the staff of the Battelle Institute, Columbus, Ohio, where he will act as technical adviser in Battelle research on high-temperature-resistant materials.

MR. HADLEIGH S. SEABORNE, of Solihull, Birmingham, a founder member and general secretary of the Institution of Incorporated Plant Engineers, has been adopted as the Liberal candidate for the newly created division of Stratford-upon-Avon and district.

MR. B. J. TAMS has been appointed general manager of J. Brockhouse & Company, Limited, manufacturers of springs and axles, iron castings, etc., of Wolverhampton. He was formerly on the head office staff of the company as assistant to the chairman and managing director.

MR. P. TATE has been appointed a director of F. H. Wheeler (Sheffield), Limited, electrical and mechanical engineers and contractors. Mr. Tate is also a director of F. H. Wheeler & Company, Limited, and has been with the Wheeler organisation for over 30 years. MR. ARNOLD WALTERS and MR. C. L. W. REES are remaining on the reconstituted board of F. H. Wheeler (Sheffield), Limited.

MR. CHARLES D. RIGG, sales manager of Smith & McLean, Limited, sheet and bar rollers, of Glasgow, has been appointed a director of the company as from January 1, 1949. Also appointed to the board are MR. JAMES BRYDEN, former works manager of the Gartcosh Works, MR. ROBERT STEWART, works manager of the Mavisbank Works, and MR. JOHN W. STEWART, works manager of the Gartcosh Works.

MR. WILLIAM MCGEOCH, deputy chairman of William McGeoch & Company, Limited, manufacturing electrical engineers and brassfounders, of Glasgow and Birmingham, received presentations from the staff and employees of the company recently to mark the occasion of his 80th birthday. Mr. McGeoch has been at the firm's Birmingham works for the last 60 years, much of that time as works managing director. He became deputy chairman at the beginning of this year.

BRIG. W. B. SALLITT has been appointed managing director of the Spooner Food Machinery Company, Limited, and a director of the Spooner Dryer & Engineering Company, Limited. He was mechanical engineer to the Copper Development Association from 1937-39, a position which brought him into contact with many members of the foundry industry. Since the war he has been deputy manager at the Bradford works of the English Electric Company, Limited.

MR. PHILLIP T. WARD, MR. GEORGE STUART WOOD, MR. J. S. BRADSHAW and MR. E. G. MORT, local directors of Thos. W. Ward, Limited, Sheffield, have now been made directors of the company. Mr. P. T. Ward is a son of Mr. Ashley S. Ward, the chairman and joint managing director, while Mr. G. S. Wood is a son of Mr. George Wood, the deputy chairman and joint managing director. Mr. Bradshaw, who has 33 years' service with the company, has concentrated his activities in the scrap-iron and steel department. He has recently been performing important duties on behalf of H.M. Government in Germany, and is at present in the Near East in connection with the organisation of scrap supplies. Mr. Mort, with 24 years' service, has charge of the company's activities in South Wales. He will now extend the sphere of his operations.

Wills

SIDDENS, H. N., a director of H. C. Siddens & Company, Limited, steel and tinplate stockholders, of West Bromwich £21,065

RICHARDSON, A. C., late managing director of the British & Colonial Horse Shoe & Machine Company, Limited, Walsall £59,272

PICKIS, SYDNEY, governing director of Richter & Pickis, Limited, engineers and contractors, iron and steel merchants, etc., of Southgate, London, N.14 ... ... £8,590

LEWIS, T. O., a director of the Steel Company of Wales, Limited, and the Burry Tinplate Box Company, Limited, Llanelly, and formerly a director of Richard Thomas & Company, Limited £32,719

TAITE & CARLTON, LIMITED, electrical engineers, of London, S.W.1, is being wound up voluntarily. Mr. S. F. Aspell, 10, New Street, Leicester, is the liquidator.

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203

Raw Material Markets

Iron and Steel

Continuous operation of the blast furnaces during the holiday period promises temporary easement of the stringency in supplies of pig-iron. But at best this can only be a fleeting palliative. The need to get more blast furnaces into operation has long been apparent and becomes a task of increasing urgency. Foundrymen have in hand an impressive volume of orders, but the pace of their activities is very largely governed by the intake of pig-iron and scrap, neither of which is available in sufficient bulk for current needs. It is hoped that the output of foundry iron will be increased next month, when another blast furnace is due to be lighted up in the Northamptonshire area, but there are still deficiencies to be overcome in the supply of hematite and low- and medium-phosphorus irons, for which refined iron is not always a satisfactory substitute.

Re-rollers of heavy sections and wide strip are now fairly comfortably situated for heavy billets and slabs, but the light re-rollers still need more small billets, and the demand for more sheet bars is also insistent. These, of course, are now familiar features which demand unremitting attention. There are indications that the demand for black and galvanised sheets in 1949 will exceed even the unprecedented volume of business from home and overseas buyers during the past year, and it will be lamentable, to say the least, if sheet-mill capacity cannot be fully employed owing to lack of material.

Light, medium, and heavy steel plates are all heavily booked and prospects of any increase in the allocations for the next period are not encouraging. Shipbuilders are gravely concerned over this matter and are making further representations to the Ministry of Supply, but there are many competing claims for supplies. Wagon builders, whose requirements cannot be ignored, call for larger tonnages, and export orders are also being licensed a little more freely. Rollers of heavy joists and sections have not such formidable commitments as the plate mills, but there is a vast export market for wrought-iron tubes, heavy steel rails and, indeed, for all classes of railway equipment. Locomotive builders have never been so busy and orders in hand ensure several years' full employment for power-plant producers.

Non-ferrous Metals

It is unlikely that there will be very much more done in non-ferrous metals this year, for, in addition to the normal holidays, some plants will be out of operation up to the end of next week due to stock-taking. So far as deliveries of metal are concerned, these are being held up by consumers as much as possible in order to facilitate stock estimation and to prevent undue accumulation of material. There is still plenty of secondary material available, for the Government is not hesitating to offer freely its arisings of surplus metal and quite recently bids were invited for a large tonnage of 70/30 brass cartridge cases. This material is all available for prompt delivery and its dispersal among conumers early in the New Year should provide a useful reinforcement to raw-material supplies and ensure a saving in consumption of virgin copper and zinc. Unfortunately, much of these Government disposals has to be stored in the open and the recent bad weather has caused the condition of the metal to deteriorate. In any case, parcels of scrap drawn from dumps not under cover must be dried off before charging into the melting furnace.

The position with regard to lead is poor, for stocks in this country are dangerously low, at least so far as virgin metal is concerned. In the United States the price is still at 21½ cents per lb., but consumers, albeit not so willingly as formerly, are paying a considerable premium for supplies of metal from foreign sources. Since the British equivalent of 21½ cents per lb. is nearly £120 per ton, a further rise in the United Kingdom price must be expected and probably January 1 will bring an announcement that the Ministry of Supply's selling limit has been raised to, say, £125 per ton or even more. But under these conditions, consumption can hardly fail to be restricted on account of high cost; in fact, were it not for the stockpile there would almost certainly have been a cut in the quotation before now.

Increases of Capital

Details of increased capital have been announced by the following companies:—

H. W. WALLACE & COMPANY, LIMITED, engineers and millwrights, etc., of Croydon, increased by £4,700, in £1 ordinary shares, beyond the registered capital of £300.

D. F. SMITH & COMPANY, LIMITED, wire workers, fabricators and processors, etc., of Tipton, Staffs, increased by £3,000, in £1 shares, beyond the registered capital of £2,000.

A.I. ELECTRIC WELDING MACHINES, LIMITED (formerly Resistance Welding Machines, Limited), London, S.W.1, increased by £9,000, in £1 ordinary shares, beyond the registered capital of £1,000.

BRAITHWAITE & COMPANY STRUCTURAL, LIMITED, constructional engineers, etc., of Great Bookham, Surrey, increased by £299,900, in £1 ordinary shares, beyond the registered capital of £100. On January 14, 1948, Braithwaite & Company Engineers, Limited, held 98 shares.

GUEST, KEEN & NETTLEFOLDS (MIDLANDS), LIMITED, screws, bolts, nuts, etc., of Smethwick, increased by (*a*) £1,215,912 and (*b*) £4,783,088, in £1 shares, beyond the registered capital of £1,000. Guest, Keen & Nettlefolds, Limited, was allotted 4,783,088 shares on October 25, 1948.

GUEST, KEEN & NETTLEFOLDS (SOUTH WALES), LIMITED, wire rods, bars and sections, etc., of Smethwick, increased by (*a*) £1,043,175 and (*b*) £2,955,825, in £1 ordinary shares, beyond the registered capital of £1,000. Guest, Keen & Nettlefolds, Limited, was allotted 2,955,825 shares on October 25, 1948.

JOHN LYSAGHT'S SCUNTHORPE WORKS, LIMITED, increased by £325,000, in £1 ordinary shares, beyond the registered capital of £1,700,000. On September 16, John Lysaght, Limited, was allotted 323,217 shares. These shares, together with 1,699,998 ordinary shares allotted on February 4, 1948, represent the consideration payable under an agreement dated October 22, 1947.

JOHN LYSAGHT'S BRISTOL WORKS, LIMITED, increased by £162,000, in £1 ordinary shares, beyond the registered capital of £550,000. John Lysaght, Limited, was allotted 161,445 shares on September 16. These shares are in addition to 499,998 shares allotted on February 4 and 50,000 on April 9, 1948. The shares represent the consideration payable under an agreement dated October 24, 1947.